

V. "On the Mathematical Expression of Observations of Complex Periodical Phenomena, and on Planetary Influence on the Earth's Magnetism." By CHARLES CHAMBERS, F.R.S., and F. CHAMBERS. Received May 26, 1873.

(Abstract.)

The authors propose in this paper to determine, by Bessel's method, a mathematical expression for a periodical phenomenon from observations which are affected by one or more other periodical phenomena, and to find criteria for judging of the extent to which the expression is affected by these other phenomena: to find also the true period from observations of a single periodical phenomenon of which the period is only approximately known; or, having found an expression for a period of known approximation to the truth, to find from it the expression for the true period. In the course of these inquiries, certain ambiguities which affect similarly Bessel's expression for a single periodic phenomenon and the results here arrived at are remarked upon; and, finally, the results are applied to determine the nature of periodic planetary phenomena in a particular case.

VI. "The Diurnal Variations of the Wind and Barometric Pressure at Bombay." By F. CHAMBERS. Communicated by CHARLES CHAMBERS, F.R.S., Director of the Colaba Observatory, Bombay. Received May 26, 1873.

(Abstract.)

The object of this paper is to bring to notice a remarkable relation that has been found to exist between the diurnal variations of the wind and the barometer at Bombay.

The observations made use of are the records of a Robinson's anemograph during the first three years of its performance, viz. from June 1867 to May 1870, and the corresponding hourly observations of the barometer and the dry- and wet-bulb thermometer made at the Government Observatory, Bombay.

The mean results for each hour of the day during the whole period and the mean diurnal variations of each element are tabulated and graphically represented by figures. The diurnal variation of the wind is then investigated, the most influential part of which is attributed to the land- and sea-breezes which blow from E.S.E. and W.N.W., and are shown to follow mainly the same law of progression as the temperature of the air, thus affording confirmatory evidence of the truth of Halley's theory of the trade-winds as applied to land- and sea-breezes.

Some peculiarities of the curve representing the land- and sea-breezes are then pointed out, and these, the writer concludes, are due to the super-